REMARKS

Claims 1-13 are pending in the application. Applicant acknowledges with appreciation the allowance of claims 2-6. Claim 2 has been amended to place it in independent form and include all the limitations of the base claim and any intervening claims.

Claim 1 has been amended and claims 8-13 have been canceled. New claims 14 and 15 have been added herein. Favorable reconsideration is respectfully requested in view of the following comments.

I. ALLOWABLE SUBJECT MATTER

The Examiner has indicated that claims 2-6 would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claim 2 has been rewritten in independent form including all the limitations of the base claim and any intervening claims.

Accordingly, claim 2 is believed to be allowable and in condition for allowance.

Claims 3-6 directly depend from amended claim 2. Accordingly, claims 3-6 are believed to be allowable and in condition for allowance.

II. REJECTION OF CLAIM 1 UNDER 35 USC §102(b)

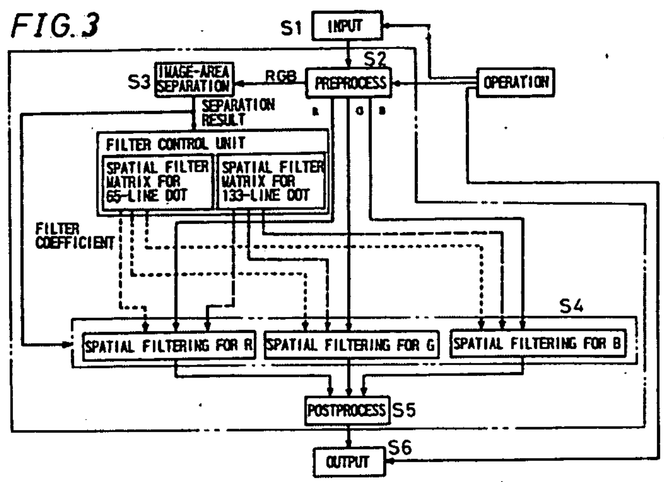
Claim 1 stands rejected under 35 U.S.C. §102(b) based on U.S. Patent No. 5,200,840 issued to *Koike et al.* (hereinafter the *Koike*). Withdrawal of the rejection is respectfully requested for at least the following reasons.

Claim 1 has been amended herein to recite an image processor that includes a moire-removing spatial filter means for performing a process of limiting spatial frequency components of an extracted dot area to an image data portion corresponding to the dot area. The moire-removing spatial filter means attenuates or removes a

predetermined spatial frequency component *of the extracted dot area* liable to cause moire appearance.

With reference to Fig. 3 of the present application (reproduced below), the pre-processed signal derived at step S2 is provided to the dot area extraction means, which at S3 separates the image into a character area, a photographic area and a dot area. The dot area corresponds to a portion of the original image, which is represented in halftone using dots.[1] The spacial filter processing section performs step S4 to perform a spatial filter process to a portion of the pre-processed image data in correspondence to the dot area for removing moire from the dot area.[2] The present invention facilitates determination of a spatial frequency that is most likely to cause moire before moire appears by using a model based on the combination of the dot formation period of the image input unit 13 (Fig. 2)and the dot formation period of the image output unit 15 (Fig. 2).[3]

FIG.3



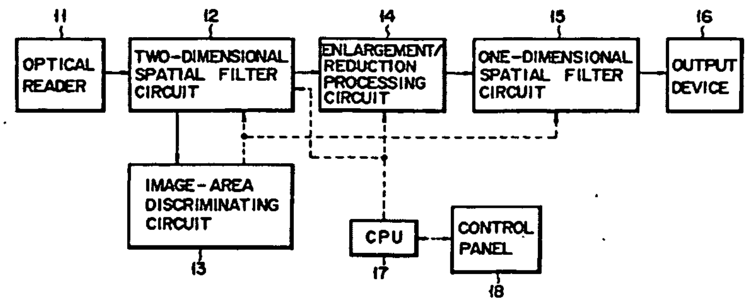
With reference to Fig. 1 of *Koike* (reproduced below), two spatial filter circuits are illustrated; a two-dimensional spatial filter circuit 12 and a one dimensional spatial filter circuit 15. The two-dimensional spatial filter circuit 12 receives three signals; one from the optical reader 11, one from the image area discriminating circuit 13, and a control signal from the CPU (the CPU control signal simply sets the enlargement/reduction

[1] See specification, page 37, last paragraph through page 38, top

[2] See specification, page 39, last paragraph through page 40, top, and Figs. 2 and 3

[3] See specification page 41, top

ratio[4]). The one-dimensional spatial filter circuit receives two signals; one from the enlargement/reduction circuit 14 and one from the image-area discriminating circuit 13. Each filter circuit and its respective input signals will be discussed below.



F I G. 1

The first signal supplied to the two-dimensional filter circuit 12 is the signal from the optical reader 11. This signal is the scan image information from the original line-by-line scan[5], which is the entire image signal from the optical reader 11.

The second signal supplied to the two-dimensional spatial filter 12 is the signal from the image area discriminating circuit 13. This signal is a discrimination result and corresponds to whether the edge of the image should be emphasized or blurred.[6] The two-dimensional spatial filter circuit 12 utilizes the data from the discrimination circuit 13 in a filter transfer function of the two-dimensional spatial filter circuit 12.[7] Thus, the two-dimensional spatial filter circuit does not operate on the signal from the image-area discriminating circuit 13, but instead uses such information in its filter transfer function.

Referring now to Fig. 2 of *Koike* (reproduced below), the details of the two-dimensional spatial filter circuit are illustrated. The two-dimensional spatial filter circuit 12 includes a 2x2 low pass filter 101, a 3x3 low pass filter 102, a Laplacian operation circuit 103, a delay line circuit 104, and a high frequency area emphasis circuit 105. The two-dimensional spatial filter circuit 12, in conjunction with the data from the image

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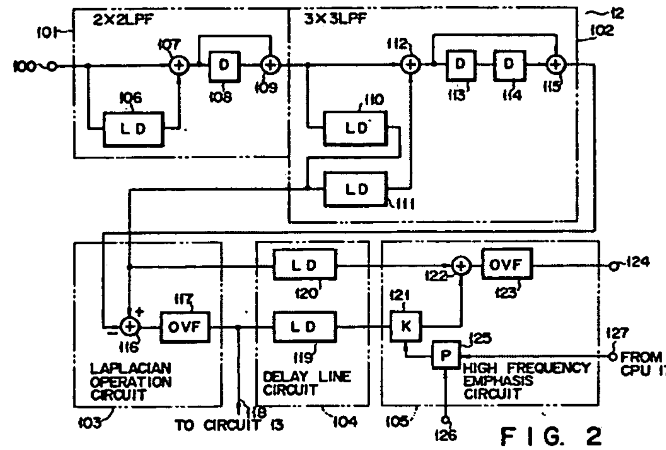
[4] Column 5, lines 58-61 of Koike

[5] Column 5, lines 8-10 of Koike

[6] Column 5, lines 24-35 of Koike

[7] Column 7, lines 1-18 of Koike



F I G. 2

area discriminating circuit 13, applies a specific filter transfer function to an input signal (e.g., the image signal) to produce a two-dimensional output at output terminal 124.[8] Thus, according to *Koike*, the two-dimensional spatial filter circuit 12 receives the entire image signal at an input terminal and filters the input signal utilizing a specific transfer function, wherein a coefficient of the transfer function is obtained from the image-area discrimination circuit 13. Nowhere, however, does *Koike* disclose that the two-dimensional spatial filter attenuates or removes a predetermined spatial frequency component of an extracted dot area liable to cause moire appearance, as recited in amended claim 1 of the present application.

Moving now to the one-dimensional spatial filter circuit 15, the first signal supplied to the one-dimensional spatial filter circuit is an output signal from the enlargement/reduction processing circuit 14. The output signal from the enlargement/reduction processing circuit 14 is an expansion/compression of the output signal of the two-dimensional spatial filter circuit 12.[9]

As was discussed above, the two-dimensional spatial filter circuit operates on the entire image signal. Moreover, *Koike* does not teach or suggest that the two-dimensional spatial filter circuit 12 produces or operates on an extracted dot image of the image signal. Therefore, the output signal of the two-dimensional spatial filter circuit 12, which is the input signal to the expansion/reduction processing circuit 14, is a filtered version of the entire image signal.

In one embodiment, the enlargement processing and the reduction processing of the expansion/reduction processing circuit 14 are executed with different algorithms,

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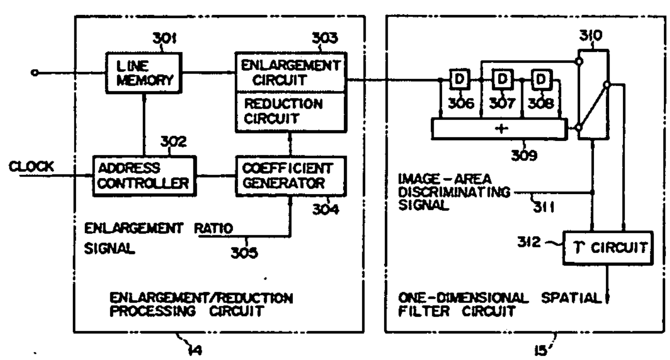
[8] Column6, line 30 through column 7, line 18 of Koike

[9] Column 5, lines 36-40 of Koike

e.g., linear interpolation for the enlargement processing and projection method for the reduction processing.[10] In another embodiment, the enlargement/reduction processing is governed by a specific equation.[11] *Koike* does not teach or suggest that the expansion/reduction processing circuit extracts a dot area from the signal. Thus, the output signal of the expansion/reduction processing circuit 14, which is the first input signal to the one-dimensional spatial filter circuit 15, is merely an amplified and filtered version of the original image input signal.

The second signal supplied to the one-dimensional spatial filter circuit 15 is the signal from the image area discriminating circuit 13. As was described above with respect to the two-dimensional spatial filter circuit 12, this signal is a discrimination result and corresponds to whether the edge of the image should be emphasized or blurred. The one-dimensional spatial filter circuit 15 utilizes the data from the discrimination circuit 13 in an average selection circuit and a filter transfer function.[12] Thus, the one-dimensional spatial filter circuit does not operate on the signal from the image-area discriminating circuit 13, but instead uses such information to generate an output signal.

Referring to Fig. 6 of *Koike* (reproduced below), the one-dimensional spatial filter circuit 15 is shown in more detail. The circuit 15 includes a series of delay circuits 306, 307, 308, an adder circuit 309, an average selection circuit 310 and a γ circuit 312. The one-dimensional spatial filter circuit 15 receives the output signal from the enlargement/reduction circuit and performs a series of 1-pixel delays 306, 307, 308 on the data, and



F I G. 6

[10] Column 9, lines 56-60 of Koike

[11] Column 13, lines22-54 of Koike

[12] Column 7, lines 1-18 of Koike

subsequently inputs these delays into an adder 309 to obtain a moving average. A selector 310 selects one of the moving averaged signals only when the moving average signal is discriminated by the image-area discriminating circuit 13 (i.e., the second input signal of the one-dimensional spatial filter circuit 15). The signal then is processed by a γ circuit 312 to increase sharpness and subsequently provided to the output device 16.[13] Thus, the one-dimensional spatial filter circuit 15 does not attenuate or removes a predetermined spatial frequency component of an extracted dot area liable to cause moire appearance, as recited in amended claim 1 of the present application.

Koike does not teach or suggest an image processor that includes a moire-removing spatial filter means for performing a process of limiting spatial frequency components of an extracted dot area to an image data portion corresponding to the dot area, wherein the moire-removing spatial filter means attenuates or removes a predetermined spatial frequency component *of the extracted dot area* liable to cause moire appearance, as recited in amended claim 1 of the present application.

Accordingly, withdrawal of the rejection of claim 1 is respectfully requested.

III. REJECTION OF CLAIM 7 UNDER 35 USC §103(a)

Claim 7 stands rejected under 35 U.S.C. §103(a) based on *Koike* in view of U.S. Patent No. 5,231,479 to *Owashi et al.* (hereinafter *Owashi*). Withdrawal of the rejection is respectfully requested for at least the following reasons.

Claim 7 depends from amended claim 1. As was discussed above, *Koike* does not teach or suggest all the limitations of amended claim 1. For example, *Koike* does not teach or suggest an image processor that includes a moire-removing spatial filter means for performing a process of limiting spatial frequency components of an extracted dot area to an image data portion corresponding to the dot area, wherein the moire-removing spatial filter means attenuates or removes a predetermined spatial frequency

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[13] Column 10, lines 38-64 and Fig. 6 of Koike

component of the extracted dot area liable to cause moire appearance, as recited in amended claim 1 of the present application.

Owashi discloses a circuit for generating a composite color picture signal by adding or mixing together separated luminance signal and separated carrier chrominance signal by making use of a filter circuit and a luminance/chrominance signal separation circuit for extracting separately the luminance signal and the carrier chrominance signal from the composite color picture signal. *Owashi,* however, does not make up for the deficiencies of *Koike*.

Accordingly, *Koike* in view of *Owashi* do not teach or suggest an image processor that includes a moire-removing spatial filter means for performing a process of limiting spatial frequency components of an extracted dot area to an image data portion corresponding to the dot area, wherein the moire-removing spatial filter means attenuates or removes a predetermined spatial frequency component of the extracted dot area liable to cause moire appearance, as recited in amended claim 1 of the present application.

Since claim 7 depends from amended claim 1, it can be distinguished from *Koike* in view of *Owashi* for at least the same reasons.

Accordingly, withdrawal of the rejection of claim 7 is respectfully requested.

IV. NEW CLAIMS 14 AND 15

New claim 14 recites an image processor that includes a dot area extraction means for extracting a dot area in an image based on image data of a subject image and moire-removing spatial filter means for performing a process of limiting spatial frequency components of the extracted dot area to an image data portion corresponding to the dot area. The moire-removing spatial filter means has a characteristic of attenuating an entirety of the spatial frequency components to be contained in the image and further *concurrently* attenuating or removing a predetermined spatial frequency component liable to cause moire appearance. Support for new claim 14 can be found, for example, in Fig. 3 and page 48, first paragraph of the specification.

Koike discloses a filtering means that includes two filter stages (the two dimensional spatial filter circuit 12 and the one-dimensional spatial filter circuit 15). The two filter circuits are configured in a serial configuration, wherein the output of the two-dimensional spatial fitler circuit 12 is upstream from the one-dimensional spatial filter circuit. Thus, a signal first must pass through the two-dimensional filter circuit before it can be acted on by the one-dimensional spatial filter circuit 15. Accordingly, the system disclosed on *Koike* does not operate on the signal concurrently. *Koike* does not teach or suggest an image processor that includes a moire-removing spatial filter means that has a characteristic of attenuating an entirety of the spatial frequency components to be contained in the image and further *concurrently* attenuating or removing a predetermined spatial frequency component liable to cause moire appearance, as recited in new claim 14.

Accordingly, new claim 14 is believed to be allowable and in condition for allowance.

New claim 15 depends from new claim 14 and therefore can be distinguished from the cited prior art for at least the same reasons. Support for new claim 15 can be found in original claim 7.

Accordingly, new claim 15 is believed to be allowable and in condition for allowance.

V. CONCLUSION

Accordingly, claims 1-7 and 14-15 are believed to be allowable and the application is believed to be in condition for allowance. A prompt action to such end is earnestly solicited.

Should the Examiner feel that a telephone interview would be helpful to facilitate favorable prosecution of the above-identified application, the Examiner is invited to contact the undersigned at the telephone number provided below.

Should a petition for an extension of time be necessary for the timely reply to the outstanding Office Action (or if such a petition has been made and an additional extension is necessary), petition is hereby made and the Commissioner is authorized to charge any fees (including additional claim fees) to Deposit Account No. 18-0988.

Respectfully submitted,

RENNER, OTTO, BOISSELLE & SKLAR, LLP

Ken Fafrak

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I hereby certify that this paper (along with any paper referred to as being attached or enclosed) is being deposited with the United States Postal Service on the date shown below with sufficient postage as first class mail in an envelope addressed to: Commissioner for Patents, PO Box 1450, Alexandria, VA 22313-1450

Ken Fafrak

MARCH 23, 2004
DATE